

SEQUENCE LISTING

- (1) GENERAL INFORMATION:
- (i) APPLICANT: Wild, Hanno; Hanco, Rudolf; Dorschug, Michael;
Horlein, Hans-Dietrich; Beunink, Jurgen;
Apeler, Heiner; Wehlmann, Hermann; and Sebald,
Walter
 - (ii) TITLE OF INVENTION: HIL-4 MUTANT PROTEINS USED AS
ANTAGONISTS OR PARTIAL AGONISTS OF
HUMAN INTERLEUKIN 4
 - (iii) NUMBER OF SEQUENCES: 20
 - (iv) CORRESPONDENCE ADDRESS:
 - (A) ADDRESSEE: Sprung Kramer Schaefer & Briscoe
 - (B) STREET: 660 White Plains Road
 - (C) CITY: Tarrytown
 - (D) STATE: New York
 - (E) COUNTRY: USA
 - (F) ZIP: 10591-5144
 - (v) COMPUTER READABLE FORM:
 - (A) MEDIUM TYPE: Diskette, 3.50 inch, 1.4 Mb storage
 - (B) COMPUTER: Apple Macintosh
 - (C) OPERATING SYSTEM: System 7.5
 - (D) SOFTWARE: WordPerfect 3.5
 - (vi) CURRENT APPLICATION DATA:
 - (A) APPLICATION NUMBER: 08/765,012
 - (B) FILING DATE: 19-DEC-1996
 - (C) CLASSIFICATION:
 - (vii) PRIOR APPLICATION DATA:
 - (A) APPLICATION NUMBER: PCT/EP95/02358
 - (B) FILING DATE: 19-JUN-1995
 - (viii) PRIOR APPLICATION DATA:
 - (A) APPLICATION NUMBER: DE 44 23 131
 - (B) FILING DATE: 01-JUL-1994
 - (ix) ATTORNEY/AGENT INFORMATION:
 - (A) NAME: Kurt G. Briscoe
 - (B) REGISTRATION NUMBER: 33,141
 - (C) REFERENCE/DOCKET NUMBER: BAYER 9776-KGB
 - (ix) TELECOMMUNICATION INFORMATION:
 - (A) TELEPHONE: (914) 332-1700
 - (B) TELEFAX: (914) 332-1844

- (2) INFORMATION FOR SEQ ID NO: 1:
- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 16 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear
 - (ii) MOLECULE TYPE: cDNA
 - (iii) HYPOTHETICAL: no

+7,0290

- (iv) ANTI-SENSE: no
- (vi) ORIGINAL SOURCE:
 - (C) INDIVIDUAL ISOLATE: synthetic
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 1:

CATGCACAAG TGCGAT

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- (2) INFORMATION FOR SEQ ID NO: 2:
- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 12 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: cDNA
- (iii) HYPOTHETICAL: no
- (iv) ANTI-SENSE: no
- (vi) ORIGINAL SOURCE:
 - (C) INDIVIDUAL ISOLATE: synthetic
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 2:

ATCGCACTTG TG

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- (2) INFORMATION FOR SEQ ID NO: 3:
- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 21 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: cDNA
- (iii) HYPOTHETICAL: no
- (iv) ANTI-SENSE: no
- (vi) ORIGINAL SOURCE:
 - (C) INDIVIDUAL ISOLATE: synthetic
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 3:

GCCTCCAAGG ACACAACTGA G

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- (2) INFORMATION FOR SEQ ID NO: 4:
- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 24 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: cDNA
- (iii) HYPOTHETICAL: no
- (iv) ANTI-SENSE: no
- (vi) ORIGINAL SOURCE:
 - (C) INDIVIDUAL ISOLATE: synthetic
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 4:

GTGAAGGAAG CCGACCAGAG TACG

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- (2) INFORMATION FOR SEQ ID NO: 5:
- (i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 36 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: cDNA
- (iii) HYPOTHETICAL: no
- (iv) ANTI-SENSE: no
- (vi) ORIGINAL SOURCE:
- (C) INDIVIDUAL ISOLATE: synthetic
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 5:

CTGGAGACTG CCATGGCCCA CAAGTGCGAT ATCACC

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- (2) INFORMATION FOR SEQ ID NO: 6:
- (i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 131 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 6:

Met Ala His Lys Cys Asp Ile Thr Leu Gln Glu
1 5

Ile Ile Lys Thr Leu Asn Ser Leu Thr Glu
10 15

Gln Lys Thr Leu Cys Thr Glu Leu Thr Val
20 25

Thr Asp Ile Phe Ala Ala Ser Lys Asn Thr
30 35

Thr Glu Asn Glu Thr Phe Cys Arg Ala Ala
40 45

Thr Val Leu Arg Gln Phe Tyr Ser His His
50 55

Glu Lys Asp Thr Arg Cys Leu Gly Ala Thr
60 65

Ala Gln Gln Phe His Arg His Lys Gln Leu
70 75

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Ile Arg Phe Leu Lys Arg Leu Asp Arg Asn
80 85

Leu Trp Gly Leu Ala Gly Leu Asn Ser Cys
90 95

Pro Val Lys Glu Ala Asn Gln Ser Thr Leu
100 105

Glu Asn Phe Leu Glu Arg Leu Lys Thr Ile
110 115

Met Arg Glu Lys Asp Ser Lys Cys Ser Ser
120 125

- (2) INFORMATION FOR SEQ ID NO: 7:
(i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 131 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 7:

Met Ala His Lys Cys Asp Ile Thr Leu Gln Glu
1 5

Ile Ile Lys Thr Leu Asn Ser Leu Thr Glu
10 15

Gln Lys Thr Leu Cys Thr Glu Leu Thr Val
20 25

Thr Asp Ile Phe Ala Ala Ser Lys Asn Thr
30 35

Thr Glu Asn Glu Thr Phe Cys Arg Ala Ala
40 45

Thr Val Leu Arg Gln Phe Tyr Ser His His
50 55

Glu Lys Asp Thr Arg Cys Leu Gly Ala Thr
60 65

Ala Gln Gln Phe His Arg His Lys Gln Leu
70 75

Ile Arg Phe Leu Lys Arg Leu Asp Arg Asn
80 85

Leu Trp Gly Leu Ala Gly Leu Asn Ser Cys
90 95

Pro Val Lys Glu Ala Asn Gln Ser Thr Leu
100 105

Glu Asn Phe Leu Glu Arg Leu Lys Thr Ile
110 115

Met Asp Glu Lys Asp Ser Lys Cys Ser Ser
120 125

- (2) INFORMATION FOR SEQ ID NO: 8:
(i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 131 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 8:

Met Ala His Lys Cys Asp Ile Thr Leu Gln Glu
1 5

Ile Ile Lys Thr Leu Asn Ser Leu Thr Glu
10 15

Gln Lys Thr Leu Cys Thr Glu Leu Thr Val
20 25

Thr Asp Ile Phe Ala Ala Ser Lys Asn Thr
30 35

Thr Glu Asn Glu Thr Phe Cys Arg Ala Ala
40 45

Thr Val Leu Arg Gln Phe Tyr Ser His His
50 55

Glu Lys Asp Thr Arg Cys Leu Gly Ala Thr
60 65

Ala Gln Gln Phe His Arg His Lys Gln Leu
70 75

Ile Arg Phe Leu Lys Arg Leu Asp Arg Asn
80 85

33

Leu Trp Gly Leu Ala Gly Leu Asn Ser Cys
90 95

Pro Val Lys Glu Ala Asn Gln Ser Thr Leu
100 105

Glu Asn Phe Leu Glu Arg Leu Lys Thr Ile
110 115

Met Asp Glu Lys Asp Asp Lys Cys Ser Ser
120 125

- (2) INFORMATION FOR SEQ ID NO: 9:
(i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 131 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 9:

Met Ala His Lys Cys Asp Ile Thr Leu Gln Glu
1 5

Ile Ile Lys Thr Leu Asn Ser Leu Thr Glu
10 15

Gln Lys Thr Leu Cys Thr Glu Leu Thr Val
20 25

Thr Asp Ile Phe Ala Ala Ser Lys Asn Thr
30 35

Thr Glu Asn Glu Thr Phe Cys Arg Ala Ala
40 45

Thr Val Leu Arg Gln Phe Tyr Ser His His
50 55

Glu Lys Asp Thr Arg Cys Leu Gly Ala Thr
60 65

Ala Gln Gln Phe His Arg His Lys Gln Leu
70 75

Ile Arg Phe Leu Lys Arg Leu Asp Arg Asn
80 85

36

Leu Trp Gly Leu Ala Gly Leu Asn Ser Cys
90 95

Pro Val Lys Glu Ala Asn Gln Ser Thr Leu
100 105

Glu Asn Phe Leu Glu Arg Leu Lys Thr Ile
110 115

Met Arg Glu Lys Asp Asp Lys Cys Ser Ser
120 125

- (2) INFORMATION FOR SEQ ID NO: 10:
(i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 131 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 10:

Met Ala His Lys Cys Asp Ile Thr Leu Gln Glu
1 5

Ile Ile Lys Thr Leu Asn Ser Leu Thr Glu
10 15

Gln Lys Thr Leu Cys Thr Glu Leu Thr Val
20 25

Thr Asp Ile Phe Ala Ala Ser Lys Asn Thr
30 35

Thr Glu Asn Glu Thr Phe Cys Arg Ala Ala
40 45

Thr Val Leu Arg Gln Phe Tyr Ser His His
50 55

Glu Lys Asp Thr Arg Cys Leu Gly Ala Thr
60 65

Ala Gln Gln Phe His Arg His Lys Gln Leu
70 75

Ile Arg Phe Leu Lys Arg Leu Asp Arg Asn
80 85

Leu Trp Gly Leu Ala Gly Leu Asn Ser Cys
90 95

35

Pro Val Lys Glu Ala Asn Gln Ser Thr Leu
100 105

Glu Asn Phe Leu Glu Arg Leu Lys Thr Ile
110 115

Met Asp Glu Lys Tyr Asp Lys Cys Ser Ser
120 125

- (2) INFORMATION FOR SEQ ID NO: 11:
(i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 130 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 11:

Met His Lys Cys Asp Ile Thr Leu Gln Glu
1 5

Ile Ile Lys Thr Leu Asn Ser Leu Thr Glu
10 15

Gln Lys Thr Leu Cys Thr Glu Leu Thr Val
20 25

Thr Asp Ile Phe Ala Ala Ser Lys Asp Thr
30 35

Thr Glu Asn Glu Thr Phe Cys Arg Ala Ala
40 45

Thr Val Leu Arg Gln Phe Tyr Ser His His
50 55

Glu Lys Asp Thr Arg Cys Leu Gly Ala Thr
60 65

Ala Gln Gln Phe His Arg His Lys Gln Leu
70 75

Ile Arg Phe Leu Lys Arg Leu Asp Arg Asn
80 85

Leu Trp Gly Leu Ala Gly Leu Asn Ser Cys
90 95

Pro Val Lys Glu Ala Asp Gln Ser Thr Leu
100 105

Glu Asn Phe Leu Glu Arg Leu Lys Thr Ile
110 115

Met Arg Glu Lys Asp Ser Lys Cys Ser Ser
120 125

- (2) INFORMATION FOR SEQ ID NO: 12:
(i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 130 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 12:

Met His Lys Cys Asp Ile Thr Leu Gln Glu
1 5

Ile Ile Lys Thr Leu Asn Ser Leu Thr Glu
10 15

Gln Lys Thr Leu Cys Thr Glu Leu Thr Val
20 25

Thr Asp Ile Phe Ala Ala Ser Lys Asp Thr
30 35

Thr Glu Asn Glu Thr Phe Cys Arg Ala Ala
40 45

Thr Val Leu Arg Gln Phe Tyr Ser His His
50 55

Glu Lys Asp Thr Arg Cys Leu Gly Ala Thr
60 65

Ala Gln Gln Phe His Arg His Lys Gln Leu
70 75

Ile Arg Phe Leu Lys Arg Leu Asp Arg Asn
80 85

Leu Trp Gly Leu Ala Gly Leu Asn Ser Cys
90 95

Pro Val Lys Glu Ala Asp Gln Ser Thr Leu
100 105

Glu Asn Phe Leu Glu Arg Leu Lys Thr Ile
110 115

Met Asp Glu Lys Asp Ser Lys Cys Ser Ser
120 125

- (2) INFORMATION FOR SEQ ID NO: 13:
(i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 130 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 13:

Met His Lys Cys Asp Ile Thr Leu Gln Glu
1 5

Ile Ile Lys Thr Leu Asn Ser Leu Thr Glu
10 15

Gln Lys Thr Leu Cys Thr Glu Leu Thr Val
20 25

Thr Asp Ile Phe Ala Ala Ser Lys Asp Thr
30 35

Thr Glu Asn Glu Thr Phe Cys Arg Ala Ala
40 45

Thr Val Leu Arg Gln Phe Tyr Ser His His
50 55

Glu Lys Asp Thr Arg Cys Leu Gly Ala Thr
60 65

Ala Gln Gln Phe His Arg His Lys Gln Leu
70 75

Ile Arg Phe Leu Lys Arg Leu Asp Arg Asn
80 85

Leu Trp Gly Leu Ala Gly Leu Asn Ser Cys
90 95

Pro Val Lys Glu Ala Asp Gln Ser Thr Leu
100 105

38

Glu Asn Phe Leu Glu Arg Leu Lys Thr Ile
110 115

Met Asp Glu Lys Asp Asp Lys Cys Ser Ser
120 125

- (2) INFORMATION FOR SEQ ID NO: 14:
(i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 130 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 14:

Met His Lys Cys Asp Ile Thr Leu Gln Glu
1 5

Ile Ile Lys Thr Leu Asn Ser Leu Thr Glu
10 15

Gln Lys Thr Leu Cys Thr Glu Leu Thr Val
20 25

Thr Asp Ile Phe Ala Ala Ser Lys Asp Thr
30 35

Thr Glu Asn Glu Thr Phe Cys Arg Ala Ala
40 45

Thr Val Leu Arg Gln Phe Tyr Ser His His
50 55

Glu Lys Asp Thr Arg Cys Leu Gly Ala Thr
60 65

Ala Gln Gln Phe His Arg His Lys Gln Leu
70 75

Ile Arg Phe Leu Lys Arg Leu Asp Arg Asn
80 85

Leu Trp Gly Leu Ala Gly Leu Asn Ser Cys
90 95

Pro Val Lys Glu Ala Asp Gln Ser Thr Leu
100 105

Glu Asn Phe Leu Glu Arg Leu Lys Thr Ile
110 115

Met Arg Glu Lys Asp Asp Lys Cys Ser Ser
120 125

- (2) INFORMATION FOR SEQ ID NO: 15:
(i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 130 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 15:

Met His Lys Cys Asp Ile Thr Leu Gln Glu
1 5

Ile Ile Lys Thr Leu Asn Ser Leu Thr Glu
10 15

Gln Lys Thr Leu Cys Thr Glu Leu Thr Val
20 25

Thr Asp Ile Phe Ala Ala Ser Lys Asp Thr
30 35

Thr Glu Asn Glu Thr Phe Cys Arg Ala Ala
40 45

Thr Val Leu Arg Gln Phe Tyr Ser His His
50 55

Glu Lys Asp Thr Arg Cys Leu Gly Ala Thr
60 65

Ala Gln Gln Phe His Arg His Lys Gln Leu
70 75

Ile Arg Phe Leu Lys Arg Leu Asp Arg Asn
80 85

Leu Trp Gly Leu Ala Gly Leu Asn Ser Cys
90 95

Pro Val Lys Glu Ala Asp Gln Ser Thr Leu
100 105

Glu Asn Phe Leu Glu Arg Leu Lys Thr Ile
110 115

40

Met Asp Glu Lys Tyr Asp Lys Cys Ser Ser
120 125

- (2) INFORMATION FOR SEQ ID NO: 16:
(i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 129 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 16:

His Lys Cys Asp Ile Thr Leu Gln Glu
1 5

Ile Ile Lys Thr Leu Asn Ser Leu Thr Glu
10 15

Gln Lys Thr Leu Cys Thr Glu Leu Thr Val
20 25

Thr Asp Ile Phe Ala Ala Ser Lys Asn Thr
30 35

Thr Glu Asn Glu Thr Phe Cys Arg Ala Ala
40 45

Thr Val Leu Arg Gln Phe Tyr Ser His His
50 55

Glu Lys Asp Thr Arg Cys Leu Gly Ala Thr
60 65

Ala Gln Gln Phe His Arg His Lys Gln Leu
70 75

Ile Arg Phe Leu Lys Arg Leu Asp Arg Asn
80 85

Leu Trp Gly Leu Ala Gly Leu Asn Ser Cys
90 95

Pro Val Lys Glu Ala Asn Gln Ser Thr Leu
100 105

Glu Asn Phe Leu Glu Arg Leu Lys Thr Ile
110 115

Met Arg Glu Lys Asp Ser Lys Cys Ser Ser
120 125

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- (2) INFORMATION FOR SEQ ID NO: 18:
- (i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 129 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 18:

His Lys Cys Asp Ile Thr Leu Gln Glu
1 5

Ile Ile Lys Thr Leu Asn Ser Leu Thr Glu
10 15

Gln Lys Thr Leu Cys Thr Glu Leu Thr Val
20 25

Thr Asp Ile Phe Ala Ala Ser Lys Asn Thr
30 35

Thr Glu Asn Glu Thr Phe Cys Arg Ala Ala
40 45

Thr Val Leu Arg Gln Phe Tyr Ser His His
50 55

Glu Lys Asp Thr Arg Cys Leu Gly Ala Thr
60 65

Ala Gln Gln Phe His Arg His Lys Gln Leu
70 75

Ile Arg Phe Leu Lys Arg Leu Asp Arg Asn
80 85

Leu Trp Gly Leu Ala Gly Leu Asn Ser Cys
90 95

Pro Val Lys Glu Ala Asn Gln Ser Thr Leu
100 105

Glu Asn Phe Leu Glu Arg Leu Lys Thr Ile
110 115

Met Asp Glu Lys Asp Asp Lys Cys Ser Ser
120 125

- (2) INFORMATION FOR SEQ ID NO: 19:
- (i) SEQUENCE CHARACTERISTICS:

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- (2) INFORMATION FOR SEQ ID NO: 17:
- (i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 129 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 17:

His Lys Cys Asp Ile Thr Leu Gln Glu
1 5

Ile Ile Lys Thr Leu Asn Ser Leu Thr Glu
10 15

Gln Lys Thr Leu Cys Thr Glu Leu Thr Val
20 25

Thr Asp Ile Phe Ala Ala Ser Lys Asn Thr
30 35

Thr Glu Asn Glu Thr Phe Cys Arg Ala Ala
40 45

Thr Val Leu Arg Gln Phe Tyr Ser His His
50 55

Glu Lys Asp Thr Arg Cys Leu Gly Ala Thr
60 65

Ala Gln Gln Phe His Arg His Lys Gln Leu
70 75

Ile Arg Phe Leu Lys Arg Leu Asp Arg Asn
80 85

Leu Trp Gly Leu Ala Gly Leu Asn Ser Cys
90 95

Pro Val Lys Glu Ala Asn Gln Ser Thr Leu
100 105

Glu Asn Phe Leu Glu Arg Leu Lys Thr Ile
110 115

Met Asp Glu Lys Asp Ser Lys Cys Ser Ser
120 125

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(A) LENGTH: 129 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 19:

His Lys Cys Asp Ile Thr Leu Gln Glu
1 5
Ile Ile Lys Thr Leu Asn Ser Leu Thr Glu
10 15
Gln Lys Thr Leu Cys Thr Glu Leu Thr Val
20 25
Thr Asp Ile Phe Ala Ala Ser Lys Asn Thr
30 35
Thr Glu Asn Glu Thr Phe Cys Arg Ala Ala
40 45
Thr Val Leu Arg Gln Phe Tyr Ser His His
50 55
Glu Lys Asp Thr Arg Cys Leu Gly Ala Thr
60 65
Ala Gln Gln Phe His Arg His Lys Gln Leu
70 75
Ile Arg Phe Leu Lys Arg Leu Asp Arg Asn
80 85
Leu Trp Gly Leu Ala Gly Leu Asn Ser Cys
90 95
Pro Val Lys Glu Ala Asn Gln Ser Thr Leu
100 105
Glu Asn Phe Leu Glu Arg Leu Lys Thr Ile
110 115
Met Arg Glu Lys Asp Asp Lys Cys Ser Ser
120 125

(2) INFORMATION FOR SEQ ID NO: 20:
(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 129 amino acids
(B) TYPE: amino acid

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(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 20:

His	Lys	Cys	Asp	Ile	Thr	Leu	Gln	Glu	
1				5					
Ile	Ile	Lys	Thr	Leu	Asn	Ser	Leu	Thr	Glu
10					15				
Gln	Lys	Thr	Leu	Cys	Thr	Glu	Leu	Thr	Val
20					25				
Thr	Asp	Ile	Phe	Ala	Ala	Ser	Lys	Asn	Thr
30					35				
Thr	Glu	Asn	Glu	Thr	Phe	Cys	Arg	Ala	Ala
40					45				
Thr	Val	Leu	Arg	Gln	Phe	Tyr	Ser	His	His
50					55				
Glu	Lys	Asp	Thr	Arg	Cys	Leu	Gly	Ala	Thr
60					65				
Ala	Gln	Gln	Phe	His	Arg	His	Lys	Gln	Leu
70					75				
Ile	Arg	Phe	Leu	Lys	Arg	Leu	Asp	Arg	Asn
80					85				
Leu	Trp	Gly	Leu	Ala	Gly	Leu	Asn	Ser	Cys
90					95				
Pro	Val	Lys	Glu	Ala	Asn	Gln	Ser	Thr	Leu
100					105				
Glu	Asn	Phe	Leu	Glu	Arg	Leu	Lys	Thr	Ile
110					115				
Met	Asp	Glu	Lys	Tyr	Asp	Lys	Cys	Ser	Ser
120					125				

45